NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D. C. 20546
Phone: (202) 755-8370

FOR RELEASE:
THURSDAY,
June 8, 1972

Howard G. Allaway
(Phone: 202/755-3680)

Daniel Wentz (LRC)
(Phone: 703/827-3966)

RELEASE NO: 72-118

VIKING PARACHUTE TESTS SCHEDULED

A series of three very high altitude flight tests of the parachute system that will lower NASA's Viking Lander gently to the surface of Mars in 1976 will take place this spring and summer in New Mexico.

In two of the tests, test spacecraft simulating the Mars entry vehicle will be carried to approximately 36.6 kilometers (120,000 feet) by a large helium-filled balloon.

The spacecraft will then be released from the balloon and rocketed at a high velocity to an altitude of 44.8 kilometers (147,000 feet).

- more -

June 2, 1972

(NASA-News-Release-72-118) VIKING PARACHUTE TESTS SCHEDULED (NASA) 10 p

N76-71766

Unclas
00/98 14022

In the third test -- at subsonic conditions -- a smaller balloon will be used to carry the test spacecraft to 28.1 kilometers (92,000 feet). From this position the spacecraft will be allowed to free-fall to the desired subsonic test conditions.

In all three tests the parachute system will open on ground command.

Successful completion of three tests -- one at supersonic speed, one transonic, and one subsonic -- will qualify the Viking parachute system for use on the missions to Mars.

First flight in the series is planned for not earlier than June 11, with balloon launch from Roswell, N.M. The parachute test will occur some 160 kilometers (100 miles) to the west, over the White Sands Missile Range.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS)

TEST SPACECRAFT

To achieve accurate simulation, a series of test spacecraft closely matching the Viking entry system which will be used at Mars has been built by the Martin-Marietta Corp.-Denver Division, prime contractor for the Viking Project.

The test spacecraft combine the shape of the Viking aeroshell with an afterbody forming a double cone 1.69 meters (5.5 feet) high and 3.53 meters (11.5 feet) in diameter. The aeroshell is a high drag aerodynamic shape designed to slow the entering spacecraft to parachute deployment conditions on Mars. The aeroshell is jettisoned after the main parachute has been deployed.

At the base of the test spacecraft, the main parachute and its deployment mortar are mounted as they will be in the planetary Viking. Goodyear Aerospace Corporation, Akron, Ohio, supplies the parachute and deployment system.

To achieve the transonic and supersonic speeds required for two of the high altitude tests, the spacecraft is equipped with two or four solid propellant rocket motors manufactured by Rocketdyne Division of North American Rockwell.

Inside the test spacecraft are instruments to record the position and motions of the vehicle and high speed cameras to photograph the parachute as it is deployed. Telemetry, communications, and electrical systems are mounted in the test vehicle.

The weight of the entire assembly (after burnout of the rocket engines) is 856.37 kilograms (1,888 pounds), closely matching the Mars entry Viking spacecraft weight.

- more -

LAUNCH SYSTEM

Two of the three high altitude Viking parachute test spacecraft will be carried to very high altitudes by a large helium-filled balloon system, manufactured by the G. T. Schjeldahl Corp. The main balloon will hold 983,000 cubic meters (34,611,000 cubic feet) of helium. A smaller launch balloon holding 8,420 cubic meters (297,000 cubic feet) of helium will lift the main assembly from the ground at launch.

The third test (subsonic) will use a smaller balloon of 118,200 cubic meters (4,166,000 cubic feet) and will rise to an altitude of 28.1 kilometers (92,000 feet).

Beneath the main balloon a cluster of three 30.5-meter (100-foot) parachutes is provided to lower the test assembly to the ground should the test have to be aborted.

The test spacecraft and ballast containers for the balloon system are carried beneath the recovery parachutes on a metal framework known as a load bar.

The entire assembly will extend 271.2 meters (890 feet) high at the time of balloon launch.

Crews of the Air Force Cambridge Research Laboratory, Bedford, Mass., are responsible for launching the balloon systems for the Viking parachute test program. All launches will be from the site of the former Walker Air Force Base near Roswell, New Mexico.

FLIGHT SEQUENCE FOR SUPERSONIC AND TRANSONIC TESTS

After launch, the balloon system carrying the test spacecraft will rise slowly to its float altitude of approximately 36.6 kilometers (120,000 feet). Prevailing seasonal winds will carry the balloon westward from Roswell some 160 kilometers (96 miles) until it is over the White Sands Missile Range test area.

At that point, if all test conditions appear favorable, the test spacecraft will be released from the load bar to begin the test sequence. Spin motors will fire to stabilize the flight path of the vehicle, followed by firing of the main rocket engines to achieve the speed required for the tests. A Mach number of 2.27 (2,630 kilometers, or 1,638 miles, per hour) is desired for the supersonic test, which will occur at an altitude of approximately 44.8 kilometers (147,000 feet). For the transonic test a Mach number of 1.2 (1,360 kilometers, or 845 miles, per hour) at 41.5 kilometers (136,200 feet) is planned.

Rocket boost will not be used for the subsonic test which will reach a Mach number of approximately 0.5 (510 kilometers, or 316 miles, per hour) at 27.8 kilometers (88,000 feet).

After the required speed and altitude are obtained, a ground command will fire the parachute ejection mortar and the Viking parachute will deploy from the test spacecraft under conditions like those to be found in the thin Martian atmosphere.

After full parachute deployment, the aeroshell will be jettisoned and the test vehicle will descend to a landing somewhere inside the White Sands Missile Range test area.

Time from drop from the balloon system to aeroshell separation will be approximately 47 seconds.

Radar and optical tracking during the flight will supplement data gathered by on-board instruments to permit project engineers to evaluate the performance of the parachute, whose success is vital to the Viking mission.

PROJECT MANAGEMENT

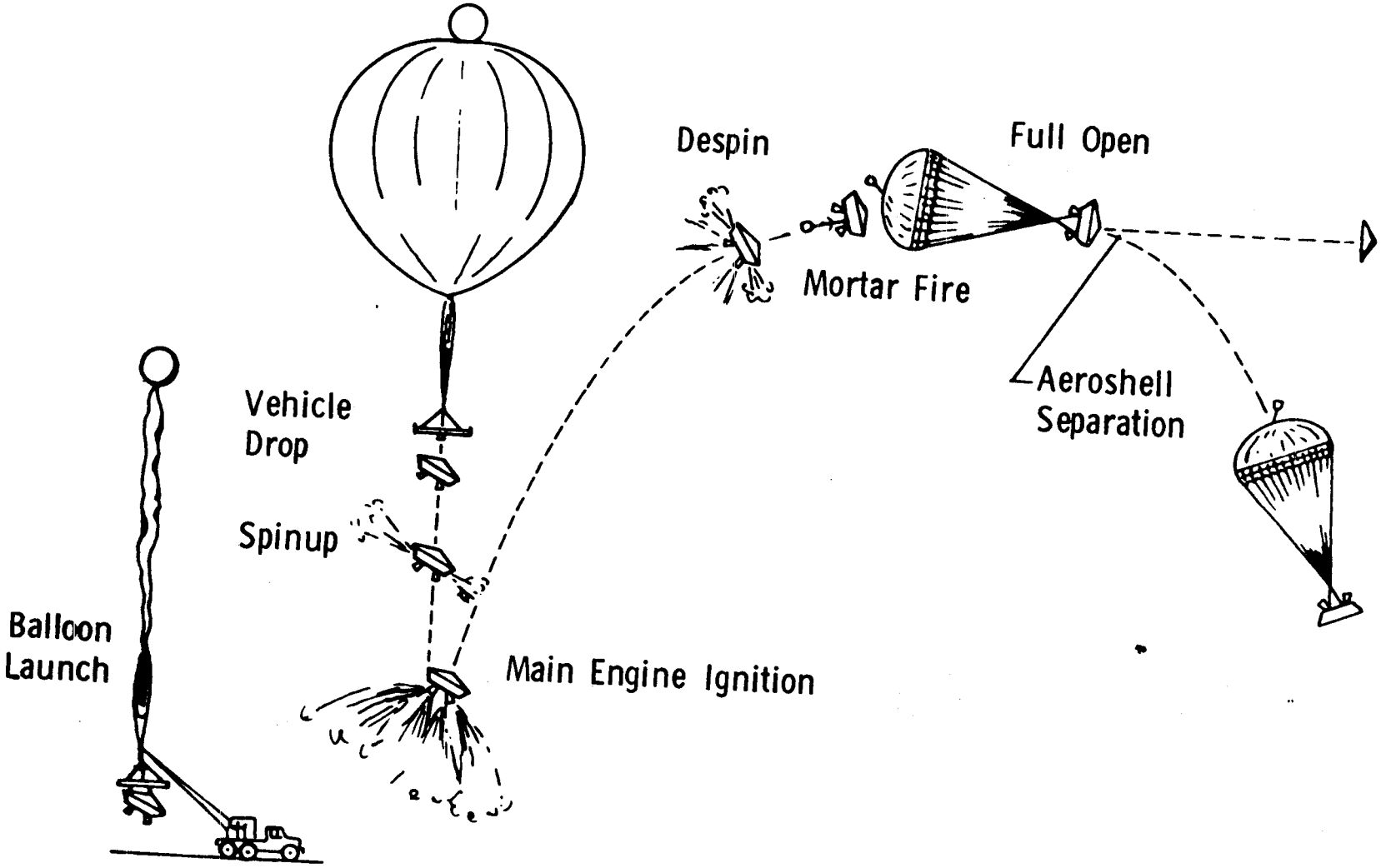
NASA's Viking Project is part of the agency's program of planetary exploration. Its goal is to land two instrumented unmanned spacecraft on the surface of Mars in the summer of 1976. Primary emphasis will be placed on a search for evidence of the existence of present, past, or potential future life on Mars.

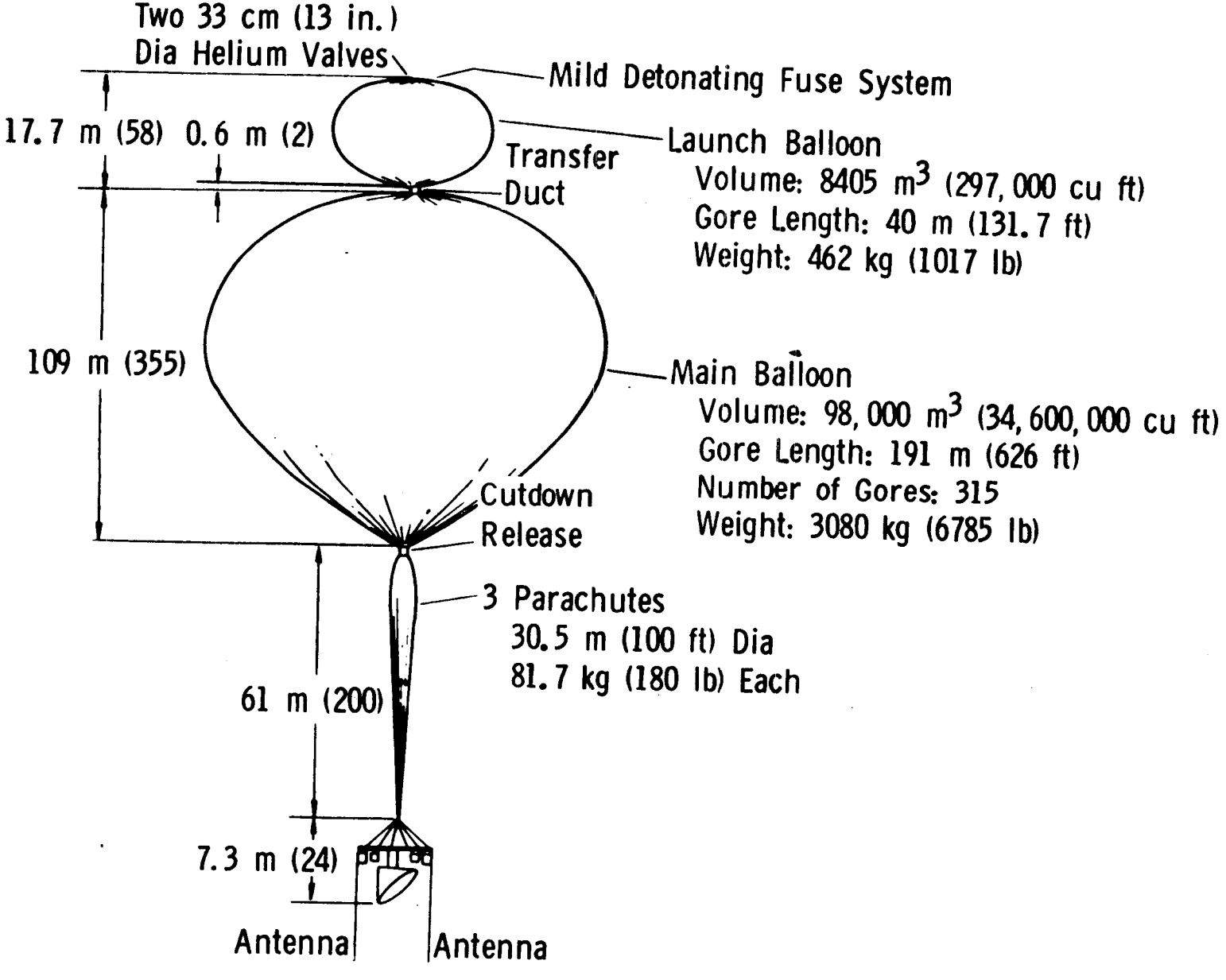
Viking is managed by the Langley Research Center, Hampton, Va., for NASA's Office of Space Science.

The high altitude parachute tests are being conducted for NASA by the Martin-Marietta Corp., and its associated subcontractors. The White Sands Missile Range is supporting the test program with its range facilities. Coordination on site is being provided by the NASA White Sands Facility, Las Cruces, N.M., an annex of the Manned Spacecraft Center, Houston, Tex. The Air Force Cambridge Research Laboratories procured the balloon launch systems and will provide the launch crews.

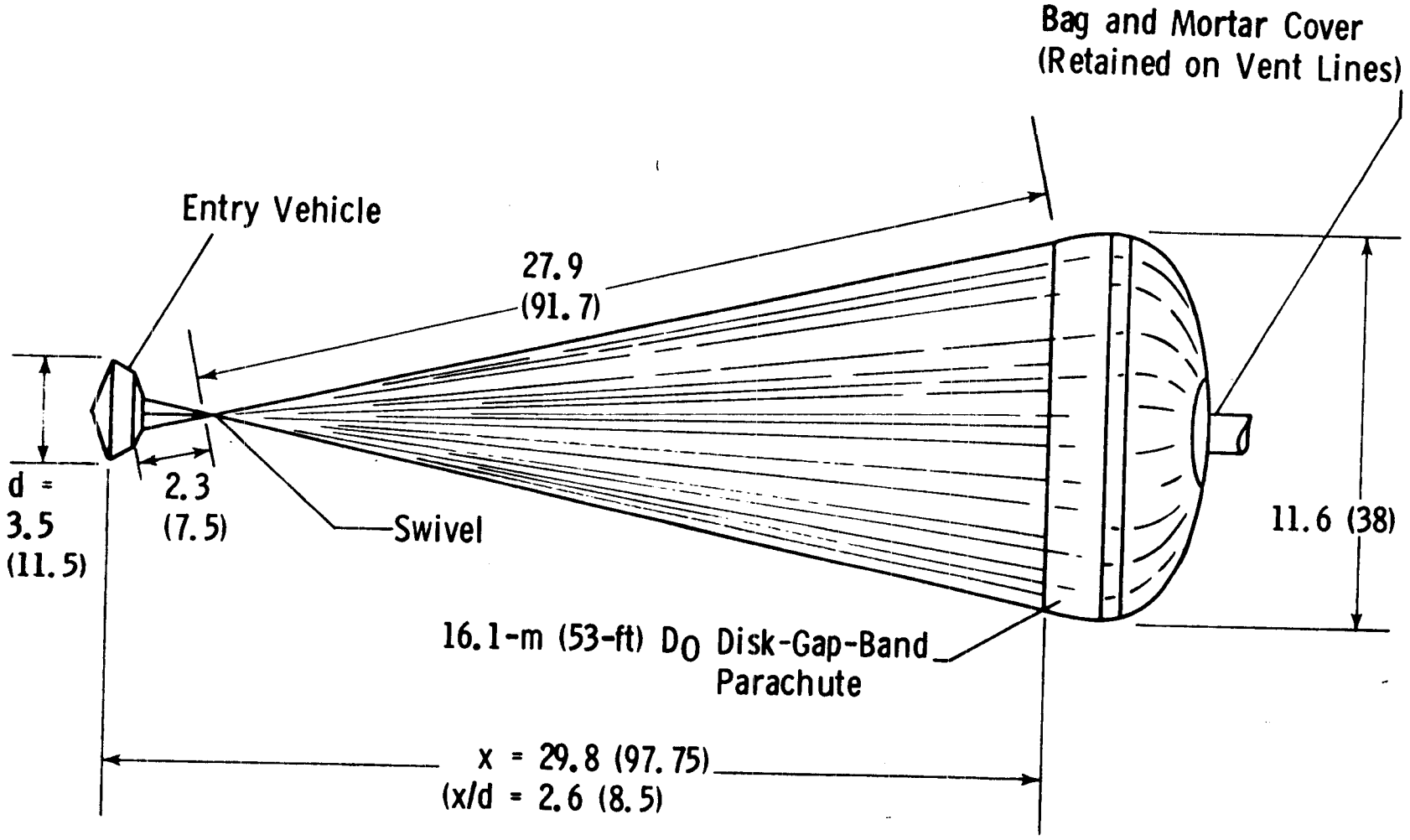
Analysis of the flight results will be made by NASA and Martin-Marietta engineers assigned to the Viking Project.

- end -


Balloon Launch
Vehicle Drop
Spinup
Main Engine Ignition
Despin
Mortar Fire
Full Open
Aeroshell Separation

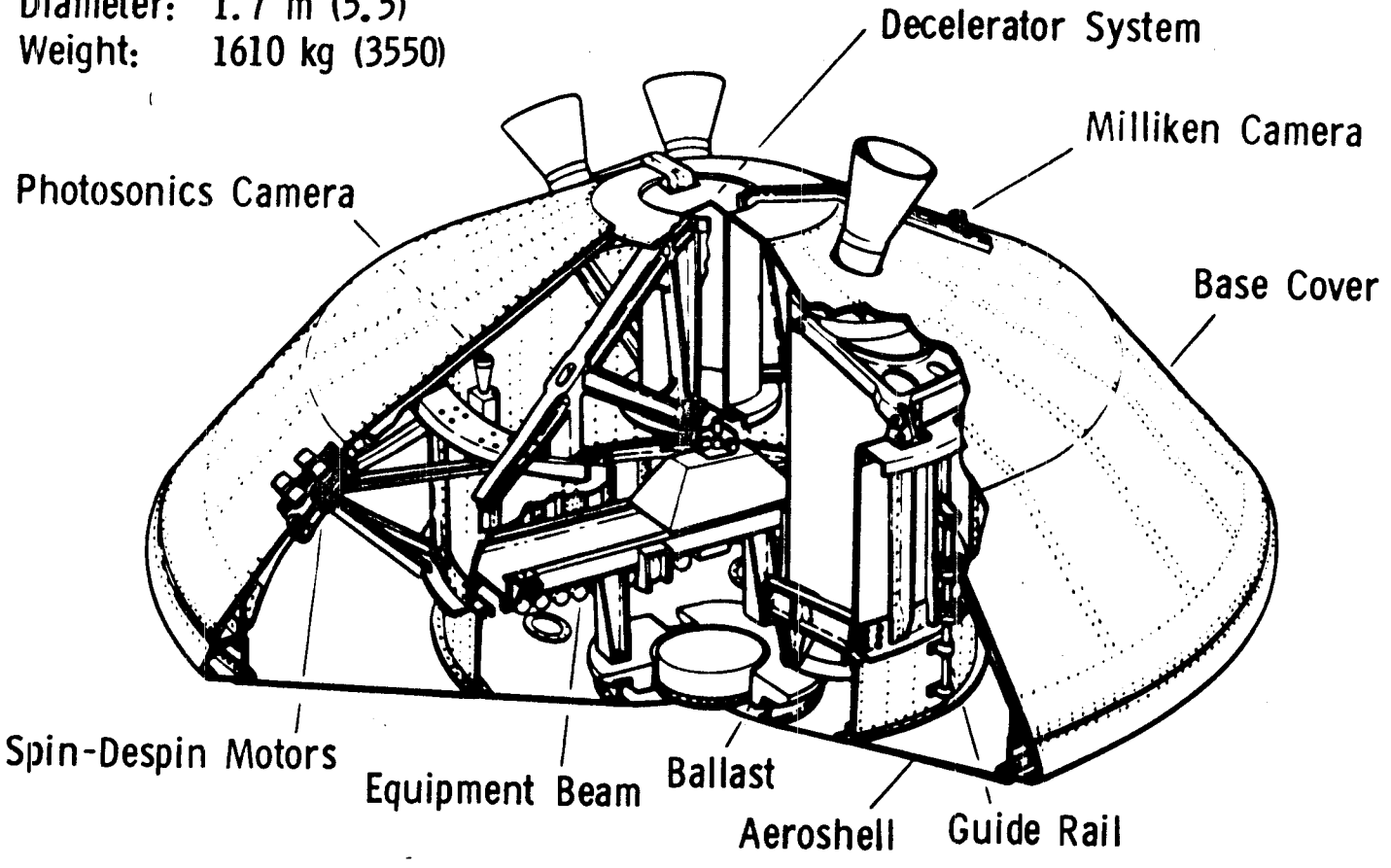

Two 33 cm (13 in.)
Dia Helium Valves
Mild Detonating Fuse System
17.7 m (58)
0.6 m (2)
Transfer
Duct
Launch Balloon
Volume: 8405 m3 (297,000 cu ft)
Gore Length: 40 m (131.7 ft)
Weight: 462 kg (1017 lb)
109 m (355)
Main Balloon
Volume: 98,000 m3 (34,600,000 cu ft)
Gore Length: 191 m (626 ft)
Number of Gores: 315
Weight: 3080 kg (6785 lb)
Cutdown
Release
3 Parachutes
30.5 m (100 ft) Dia
81.7 kg (180 lb) Each
61 m (200)
7.3 m (24)
Antenna
Antenna

DECELERATOR SYSTEM



Note: All dimensions in meters (feet)

Height: 1.7 m (5.5)
Diameter: 1.7 m (5.5)
Weight: 1610 kg (3550)



TEST SPACECRAFT